UWFL-47

HEALTH AND SAFETY

UNITED STATES ATOMIC ENERGY COMMISSION

SURVEY OF RADIOACTIVITY IN THE SEA AND IN PELAGIC MARINE LIFE WEST OF THE MARSHALL ISLANDS, SEPTEMBER 1–20, 1956

By
Allyn H. Seymour
Edward E. Held
Frank G. Lowman
John R. Donaldson
Dorothy J. South

March 15, 1957

Applied Fisheries Laboratory
University of Washington
Seattle, Washington

Technical Information Service Extension, Oak Ridge, Tenn.

UWFL-47

SURVEY OF RADIOACTIVITY IN THE SEA AND IN PELAGIC MARINE LIFE WEST OF THE MARSHALL ISLANDS SEPTEMBER 1-20, 1956

Allyn H. Seymour
Edward E. Held
Frank G. Lowman
John R. Donaldson
Dorothy J. South

Applied Fisheries Laboratory
University of Washington
Seattle, Washington

March 15, 1957

Operated by the University of Washington under Contract No. AT(45-1)540 with the United States Atomic Energy Commission

ABSTRACT

A survey of the radioactivity in the sea in the region of the North Equatorial Current from the Marshall Islands to the Marianas Islands was made in September 1956. The expedition was sponsored by the United States Atomic Energy Commission, Division of Biology and Medicine, and carried out by the Applied Fisheries Laboratory, University of Washington, with the support and cooperation of the United States Navy.

Plankton samples were taken by oblique tows from 200 meters and water samples were taken from the surface, 25, 50, 100, and 150 meters at 74 stations. The general pattern of distribution of radioactivity shows a sharp decrease east of Bikini and a gradual but irregular decrease west of Eniwetok. A slight degree of contamination is indicated as far to the west as Guam, the western extremity of the survey. Non-fission products account for a large proportion of the radioactivity in plankton and fish samples.

CONTENTS

SURVEY OF RADIOACTIVITY IN THE SEA AND IN PELAGIC MARINE LIFE WEST OF THE MARSHALL ISLANDS SEPTEMBER 1-20, 1956

INTRODUCTION

The amount of radioactivity in the sea and in pelagic marine life during and following weapons tests at the Pacific Proving Ground has been the subject of reports by United States and Japanese laboratories.

Following the 1954 test series, the Japanese survey ship, Shunkotsu-Maru, made a general survey of the amount and distribution of radioactivity in sea water and in some of the marine life in the region west of the Marshall Islands. The report of the Japanese survey[1] indicated that measurable amounts of radioactivity were to be found in the sea even as late as the spring of 1955.

Operation Troll[2] was conducted during the spring of 1955 to measure the level of radioactivity in the sea and the movement of the water mass containing the radioactivity. This was a joint operation of the New York Operations Office, U. S. Atomic Energy Commission, Scripps Institute of Oceanography,

University of California, and the Applied Fisheries Laboratory, University of Washington.

The findings of Operation Troll, the 17,419 mile cruise of the Taney from February 25 to May 3, 1955, were summarized as follows:

1. Sea water and plankton samples show the existence of widespread low-level activity in the Pacific Ocean. Water activity ranged from 0-570 d/min/liter and plankton from 3-140 d/min/g wet weight.

2. There is some concentration of the activity in the main current streams, such as the North Equatorial Current. The highest activity was off the coast of Luzon, averaging 190 d/min/liter down to 600 m (April 1, 1955).

3. Analyses of fish indicate no activity approaching the maximum permissible level for foods. The highest activity in tuna fish was 3.5 d/min/g ash, less than 1 percent of the permissible level.

4. Measurements of plankton activity offer a sensitive indication of activity in the ocean.

5. Similar operations would be valuable in assessing the activity from future tests and in gathering valuable data for oceanographic studies.

The Division of Biology and Medicine of the U. S. Atomic Energy Commission requested the Applied Fisheries Laboratory of the University of Washington to conduct surveys of the open sea during 1956 to determine "(a) the levels of introduced radioactivity resulting from the tests in the water, plankton, and fish, and (b) how far the activity extends westward in the North Equatorial current."